<u>Claims</u>

1.   A method for upscaling image data, comprising:

identifying a gradient value associated with a pixel location of the image data;

determining whether a direction associated with the pixel location is one of a horizontal direction and a vertical direction; and

applying a weighted interpolation scheme to a value corresponding to the pixel location when the direction is one of a horizontal direction and a vertical direction.

2.   The method of claim 1, further comprising:

applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the value corresponding pixel location when the direction is one of a non-horizontal direction and a non-vertical direction.

3.   The method of claim 1, wherein the method operation of identifying a gradient value associated with a pixel location of the image data includes,

determining a partial derivative associated with the pixel location.

4.   The method of claim 1, wherein the method operation of determining whether a direction associated with the pixel location is one of a horizontal direction and a vertical direction includes,

defining a horizontal component of the gradient value;

defining a vertical component of the gradient value; and

calculating a magnitude of the gradient value from the horizontal component and the vertical component.

5.   The method of claim 4, further comprising:

computing a direction angle associated with the pixel location based upon both the horizontal component and the vertical component; and

comparing the magnitude of the gradient value to a threshold value, wherein if the threshold value is greater than the magnitude, the method includes,

applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the value corresponding pixel location irrespective of the direction.

6. The method of claim 5, wherein the method operation of computing a direction angle associated with the pixel location based upon both the horizontal component and the vertical component includes,

defining the direction angle relative to a horizontal axis.

7. The method of claim 4, wherein the method operation of defining a horizontal component of the gradient value includes,

defining a partial derivative where a horizontal direction variable is held constant.

8. The method of claim 4, wherein the method operation of defining a vertical component of the gradient value includes,

defining a partial derivative where a vertical direction variable is held constant.

9. The method of claim 1, wherein the gradient is defined as a two dimensional vector.

10. The method of claim 1, wherein the method operation of applying a weighted interpolation scheme to the pixel location when the direction is one of a horizontal direction and a vertical direction includes,

transforming coordinates representing the pixel location through a function having a sigmoidal shape.

11.   A method for scaling video data, comprising:

determining whether a block of image data of a current frame is flagged to indicate a level of difference with a corresponding block of image data of a previous frame;

if the block of image data of the current frame is flagged to indicate a level of difference with the corresponding block of image data of the previous frame, then the method includes;

applying a weighted interpolation scheme adaptively to each pixel location within the block of image data of the current frame based upon a direction associated with the pixel location.

12.   The method of claim 11, wherein if the block of image data of a current frame is flagged to indicate a level of redundancy with the corresponding block of image data of the previous frame, then the method includes;

copying upscaled data representing the corresponding block of image data of the previous frame into an upscaled block of image data of the current frame.

13.   The method of claim 11, wherein the method operation of applying a weighted interpolation scheme adaptively to each pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

determining whether a direction associated with a pixel is one of a horizontal direction and a vertical direction.

14.   The method of claim 13, further comprising:

identifying a gradient value associated with the pixel;

defining a horizontal component of the gradient value;

defining a vertical component of the gradient value; and

calculating a magnitude of the gradient value from the horizontal component and the vertical component.

15.   The method of claim 11, wherein the method operation of applying a weighted interpolation scheme adaptively to each pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

transforming coordinates representing one of the each pixel location through a function associated with a sigmoidal shape.

16.   The method of claim 14, further comprising

computing a direction angle associated with each pixel location based upon both the horizontal component and the vertical component; and

comparing the magnitude of the gradient value to a threshold value, wherein if the threshold value is greater than the magnitude, the method includes,

applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to a value corresponding to the pixel location.

17.   A computer readable medium having program instructions for upscaling image data, comprising:

program instructions for identifying a gradient value associated with a pixel location of the image data;

program instructions for determining whether a direction associated with the pixel location is one of a horizontal direction and a vertical direction; and

program instructions for applying a weighted interpolation scheme to the pixel location when the direction is one of a horizontal direction and a vertical direction.

18.   The computer readable medium of claim 17, further comprising:

program instructions for applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the pixel location when the direction is one of a non-horizontal direction and a non-vertical direction.

19.   The computer readable medium of claim 17, wherein the program instructions for identifying a gradient value associated with a pixel location of the image data includes,

program instructions for determining a partial derivative associated with the pixel location.

20.   The computer readable medium of claim 17, wherein the program instructions for determining whether a direction associated with the pixel location is one of a horizontal direction and a vertical direction includes,

program instructions for defining a horizontal component of the gradient value;

program instructions for defining a vertical component of the gradient value; and

program instructions for calculating a magnitude of the gradient value from the horizontal component and the vertical component.

21.   The computer readable medium of claim 20, further comprising:

program instructions for computing a direction angle associated with the pixel location based upon both the horizontal component and the vertical component; and

program instructions for comparing the magnitude of the gradient value to a threshold value; and

program instructions for applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the pixel location when the magnitude of the gradient value exceeds the threshold value.

22.   The computer readable medium of claim 17, wherein the program instructions for applying a weighted interpolation scheme to the pixel location when the direction is one of a horizontal direction and a vertical direction includes,

program instructions for transforming coordinates representing the pixel location through a function having a sigmoidal shape.

23.   A computer readable medium having program instructions for scaling video data, comprising:

program instructions for determining whether a block of image data of a current frame is flagged to indicate a level of difference with a corresponding block of image data of a previous frame; and

program instructions for applying a weighted interpolation scheme adaptively to a pixel location within the block of image data of the current frame based upon a direction associated with the pixel location when the block of image data of the current frame is flagged to indicate a level of difference with the corresponding block of image data of the previous frame.

24.   The computer readable medium of claim 23, wherein the program instructions for applying a weighted interpolation scheme adaptively to each pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

program instructions for determining whether a direction associated with a pixel is one of a horizontal direction and a vertical direction.

25.   The computer readable medium of claim 24, further comprising:

program instructions for identifying a gradient value associated with the pixel;

program instructions for defining a horizontal component of the gradient value;

program instructions for defining a vertical component of the gradient value; and

program instructions for calculating a magnitude of the gradient value from the horizontal component and the vertical component.

26.   The computer readable medium of claim 23, wherein the program instructions for applying a weighted interpolation scheme adaptively to each pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

program instructions for transforming coordinates representing one of the each pixel location through a function having a sigmoidal shape.

27.   A system for processing block based image data, comprising:

an encoder configured to compress video data, the encoder configured to set a coded block indicator to a first value when inter frame redundancies between corresponding blocks of successive frames of a video stream exceed a threshold value, the encoder further configured to set the coded block indicator to a second value when

the inter frame redundancies between successive frames of a video stream are less than or equal to the threshold value;

a decoder configured to decompress the video data, and

a scaling module configured to scale the decompressed video data, the scaling module including circuitry for identifying the coded block indicator for each block, the scaling module further including circuitry for adaptively applying a weighted interpolation scheme to a pixel location within a current frame when the coded block indicator is equal to the first value.

28.   The system of claim 27, wherein the threshold value represents a summation of differences between corresponding pixel values of the successive frames of the video stream.

29.   The system of claim 27, wherein the circuitry for adaptively applying a weighted interpolation scheme includes circuitry for copying a block corresponding to the pixel location from a previous frame when the coded block indicator is equal to the second value.

30.   The system of claim 27, wherein the scaling module is incorporated into the decoder.

31.   The system of claim 27, wherein the circuitry for adaptively applying a weighted interpolation scheme includes circuitry for determining whether a direction associated with a gradient corresponding to the pixel location is one of a horizontal direction and a vertical direction.

32.   The system of claim 31, wherein the circuitry for determining whether a direction associated with a gradient corresponding to the pixel location is one of a horizontal direction and a vertical direction includes,

circuitry for calculating a magnitude of the gradient from both a horizontal component of the gradient and a vertical component of the gradient.

33.   An integrated circuit capable of scaling image data, comprising:

logic for calculating a gradient value associated with a pixel location of the image data;

logic for determining whether an angle defined by a vector associated with the gradient value and an axis is one of a substantially parallel angle and one of a substantially perpendicular angle; and

logic for applying a weighted interpolation scheme to the pixel location when the direction is both a) one of a horizontal direction and a vertical direction and b) the gradient value exceeds a threshold value.

34.   The integrated circuit of claim 33, further comprising:

logic for applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the pixel location when the direction is one of a non-horizontal direction and a non-vertical direction.

35.   The integrated circuit of claim 33, wherein the logic for identifying a gradient value associated with a pixel location of the image data includes,

logic for determining a partial derivative associated with the pixel location.

36.   The integrated circuit of claim 33, wherein the logic for determining whether a direction associated with the pixel location is one of a horizontal direction and a vertical direction includes,

logic for defining a horizontal component of the gradient value;

logic for defining a vertical component of the gradient value; and

logic for calculating a magnitude of the gradient value from the horizontal component and the vertical component.

37.   The integrated circuit of claim 36, further comprising:

logic for computing a direction angle associated with the pixel location based upon both the horizontal component and the vertical component;

logic for comparing the magnitude of the gradient value to a threshold value; and

logic for applying one of a bilinear interpolation scheme and a bicubic interpolation scheme to the pixel location when the threshold value is greater than the gradient value.

38.   The integrated circuit of claim 33, wherein each logic element is one or a combination of hardware and software.

39.   An integrated circuit having for scaling video data, comprising:

logic for determining whether a block of image data of a current frame is flagged to indicate a level of difference with a corresponding block of image data of a previous frame;

logic for applying a weighted interpolation scheme adaptively to a pixel location within the block of image data of the current frame based upon a direction associated with the pixel location, wherein the block of image data of the current frame is associated

with a flag indicative of a level of difference with the corresponding block of image data of the previous frame; and

logic for applying a bilinear interpolation scheme when the direction associated with the pixel location excludes the weighted interpolation scheme.

40.   The integrated circuit of claim 39, wherein the logic for applying a weighted interpolation scheme adaptively to a pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

logic for transforming coordinates representing one of the each pixel location through a function associated with a sigmoidal shape.

41.   The integrated circuit of claim 39, wherein the logic for applying a weighted interpolation scheme adaptively to a pixel location within the block of image data of the current frame based upon a direction associated with the pixel location includes,

logic for determining whether a direction associated with a pixel is one of a horizontal direction and a vertical direction.

42.   The integrated circuit of claim 39, further comprising:

logic for detecting the flag.

43.   The integrated circuit of claim 39, wherein each logic element is one or a combination of hardware and software.